

Application Number 10/528977
Response to Office Action dated 04/09/2007

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of claims:

1. (Currently Amended) A collapsible lens barrel comprising:
 - a first holding frame for holding a first lens group
 - a second holding frame for holding a second lens group that is disposed on an image plane side with respect to the first lens group
 - an actuator for moving the second holding frame in an optical axis direction and
 - a tubular cam frame comprising a plurality of cam grooves that are formed at substantially equal intervals around a circumferential direction for moving the first holding frame in the optical axis direction;wherein the actuator is attached to a portion in the cam frame where the cam grooves are not formed and the actuator is operable to move the second holding frame independently from a movement of the first holding frame by a movement of the first holding frame by the cam grooves of the tubular cam frame.
2. (Original) The collapsible lens barrel according to claim 1, further comprising
 - a detecting member for detecting a position of the second holding frame,
 - a substantially hollow cylindrical driving frame that is rotatable around an optical axis and moves together with the first holding frame in the optical axis direction, and
 - a driving gear for rotating the driving frame,wherein the cam grooves mate with the driving frame, and the driving frame moves in the optical axis direction along the cam grooves with a rotation of the driving frame, and
 - the detecting member and the driving gear respectively are attached to the portion in the cam frame where the cam grooves are not formed.

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3. (Original) The collapsible lens barrel according to claim 2, wherein the cam frame is molded out of a resin by using a molding die, which is a combination of a plurality of molding die parts, and

at least one of the plurality of cam grooves formed on the cam frame and at least one of mounting portions of the actuator, the detecting member and the driving gear are molded with a common molding die part.

4. (Original) The collapsible lens barrel according to claim 1, further comprising at least two rod—like guide members parallel with each other whose one end is fixed to the first holding frame,

wherein the second holding frame is held slidably by the guide members.

5. (Original) The collapsible lens barrel according to claim 4, wherein each of the guide members is fixed to the first holding frame by being press-fitted into two through holes penetrating in the optical axis direction that are spaced from each other.

6. (Original) The collapsible lens barrel according to claim 1, wherein a gap is provided between the first lens group and the first holding frame in a direction perpendicular to an optical axis, and the first lens group and the first holding frame move toward the image plane side and a front end of the actuator enters the gap at a time of non-capturing.

7. (Original) The collapsible lens barrel according to claim 1, further comprising a substantially hollow cylindrical driving frame that rotates around an optical axis relative to the cam frame, thereby moving together with the first holding frame in the optical axis direction,

wherein the driving frame comprises mating members for mating with the cam grooves, and

wide portions whose width along the optical axis direction is increased are formed in the cam grooves so that the mating members do not contact the cam grooves when the first lens group is moved furthest to the image plane side.

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8. (Original) The collapsible lens barrel according to claim 1, further comprising a detecting member disposed for detecting an absolute position of the second holding frame in the optical axis direction when the second holding frame is at a position furthest to the image plane side or in the vicinity thereof.

9. (Original) The collapsible lens barrel according to claim 8, wherein the position furthest to the image plane side substantially is a telephoto end position in an optical system.

10. (Original) An optical instrument to which the collapsible lens barrel according to claim 1 is attached, the optical instrument comprising:

a storing system capable of storing an optical zooming factor at a time of turning off a power as an initial optical zooming factor information;

wherein, in the case where the initial optical zooming factor information is stored in the storing system, the second lens group is moved to and stopped at an optical zooming factor position based on the initial optical zooming factor information when the power is turned on.

11. (Original) An optical instrument to which the collapsible lens barrel according to claim 1 is attached, the optical instrument comprising:

an input system for inputting an optical zooming factor at a time of turning on a power; and

a storing system for storing the optical zooming factor inputted from the input system as an initial optical zooming factor information;

wherein, in the case where the initial optical zooming factor information is stored in the storing system, the second lens group is moved to and stopped at an optical zooming factor position based on the initial optical zooming factor information when the power is turned on.

12. (New) A collapsible lens barrel comprising:

a first holding frame for holding a first lens group;

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a second holding frame for holding a second lens group that is disposed on an image plane side with respect to the first lens group;

an image blurring correction device for holding a third lens group for correcting an image blurring that is disposed on an image plane side with respect to the second lens group;

a first actuator for moving the first holding frame toward the object plane side at the time of non-capturing an image;

a second actuator for moving the second holding frame in the optical axis direction; and

at least two rod-like guide members each having an end fixed to the first holding frame;

wherein the second holding frame is supported to be slidable with respect to the image blurring correcting device in the optical axis direction by the at least two rod-like guide members; and

wherein the at least two rod-like guide members are slidable with respect to the second holding frame and the image blurring correcting device in the optical axis direction upon movement of the first holding frame.

13. (New) The collapsible lens barrel according to claim 12, further comprising a portion of a rack engaged with the second actuator and fixed to an image plane side of the second holding frame.

14. (New) The collapsible lens barrel according to claim 12, further comprising actuators provided on the image blurring correcting device for moving the third lens group in a perpendicular direction with respect to the optical axis.

15. (New) The collapsible lens barrel according to claim 14, wherein the actuators are disposed on a same side of an imaginary line intersecting the guide members on the image blurring correcting device.

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16. (New) The collapsible lens barrel according to claim 14, wherein the position detecting positions are disposed on a same side of an imaginary line intersecting the guide members on the image blurring correcting device.